4/24: 9.4

4/26: Transformation & Statistic day 1

4/30: 9.1 Quiz (15 min)
Transformation & Statistic day 2

5/2: EOC Review

5/7 } EOC Review at 12:30 - 1:30 pm
5/8 } @ Auditorium (5 Extra Points for each day)

Ms. Li ← 5/7
5/8 → Mr. Diaz

9.4 Linear, Quadratic, and Exponential Functions

Linear Functions

(1st differences are the same)

x	y
2	5
4	2
6	−1
8	−4

Linear

2 − 5 = −3
−1 − 2 = −3
−4 − (−1) = −3
} same

Quadratic Functions

(2nd differences are the same)

x	y
1	−8
2	−5
3	0
4	7

Quadratic

−5 − (−8) = 3
0 − (−5) = 5
7 − 0 = 7
2
2
} same

Exponential Functions

(Same Ratio)

x	y
0	−2
1	−8
2	−32
3	−128

Exponential

×4
×4
×4
} same ratio

Look for a pattern in each data set to determine which kind of model best describes the data.

1)

x	y
0	6
1	12
2	24
3	48

×2, ×2, ×2

Exponential because same ratio.

2)

x	y
3	4
6	12
9	24
12	48

8, 12, 24 → 4, 12

None or N/A

3)

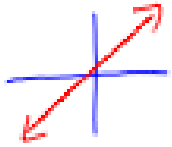
x	y
0	10
1	18
2	28
3	40

8, 10, 12 → 2, 2

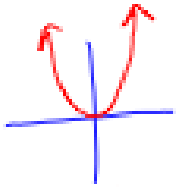
Quadratic because the 2nd difference is the same.

Graphs of Linear, Quadratic, and Exponential Functions:

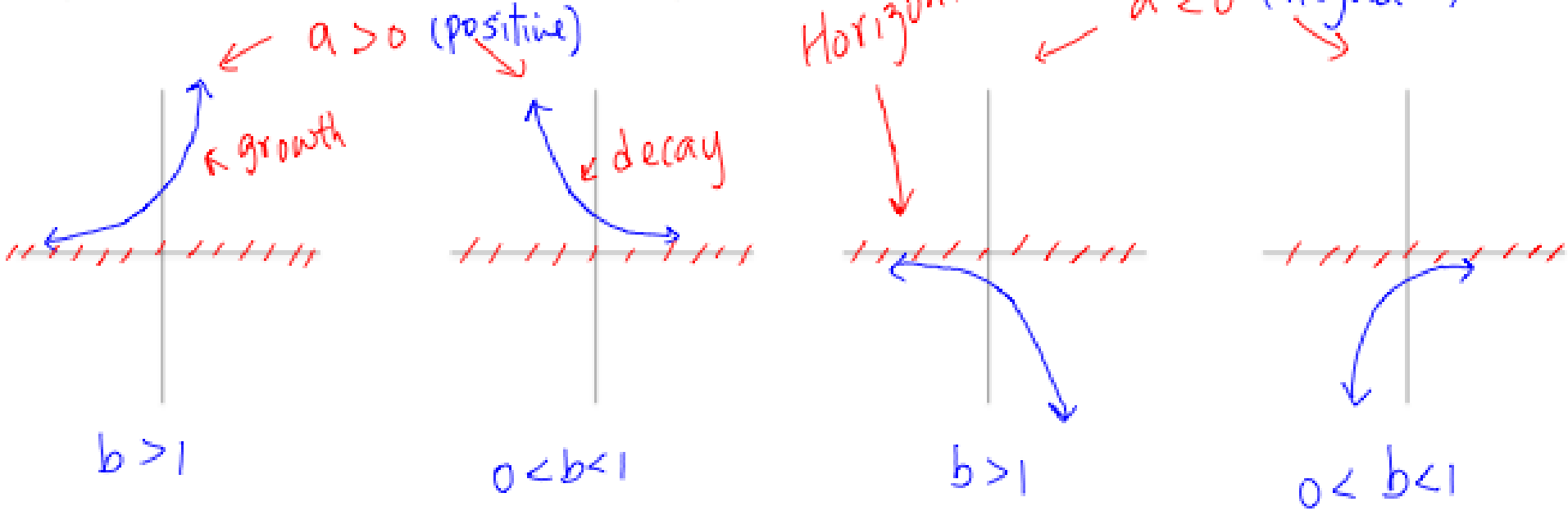
Linear Functions: $y = mx + b$



Quadratic Functions: $y = ax^2 + bx + c$



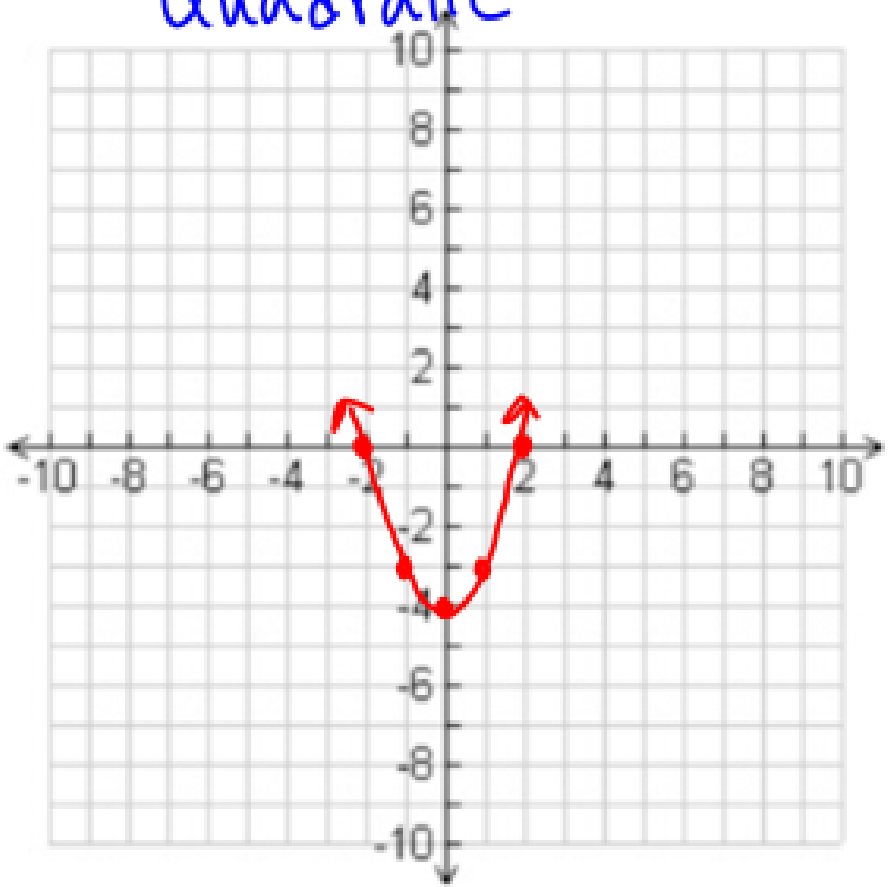
Exponential Functions: $y = ab^x$



Graph to decide whether data is best modeled by a linear, quadratic, or exponential function.

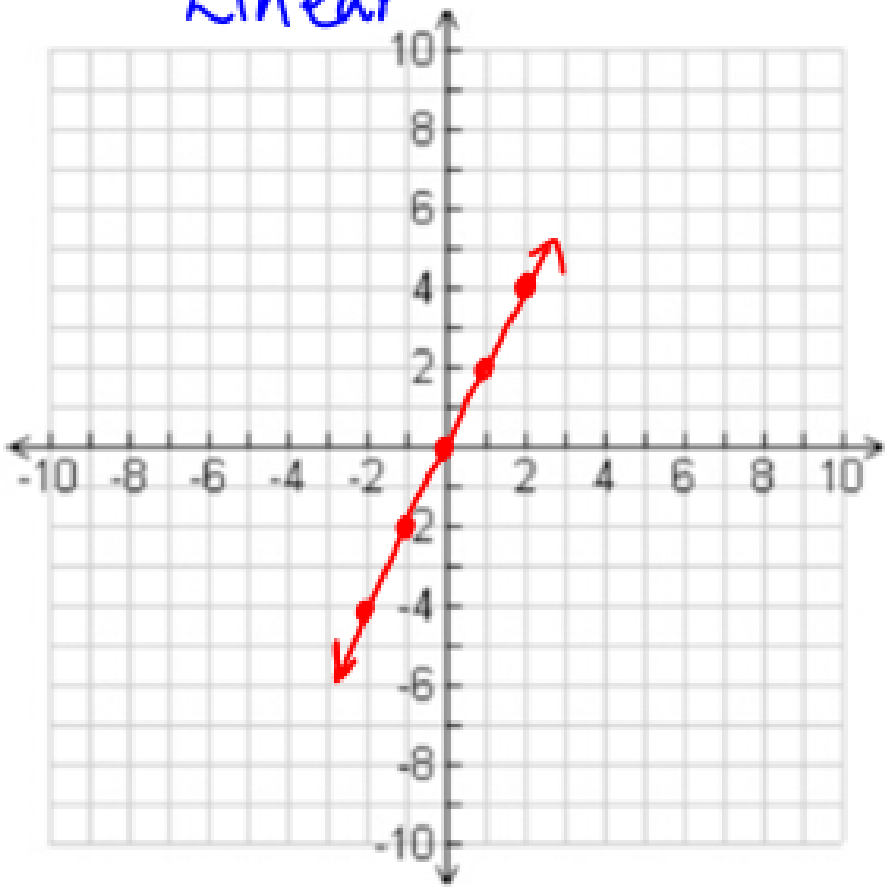
4) (−2, 0), (−1, −3), (0, −4), (1, −3), (2, 0)

Quadratic

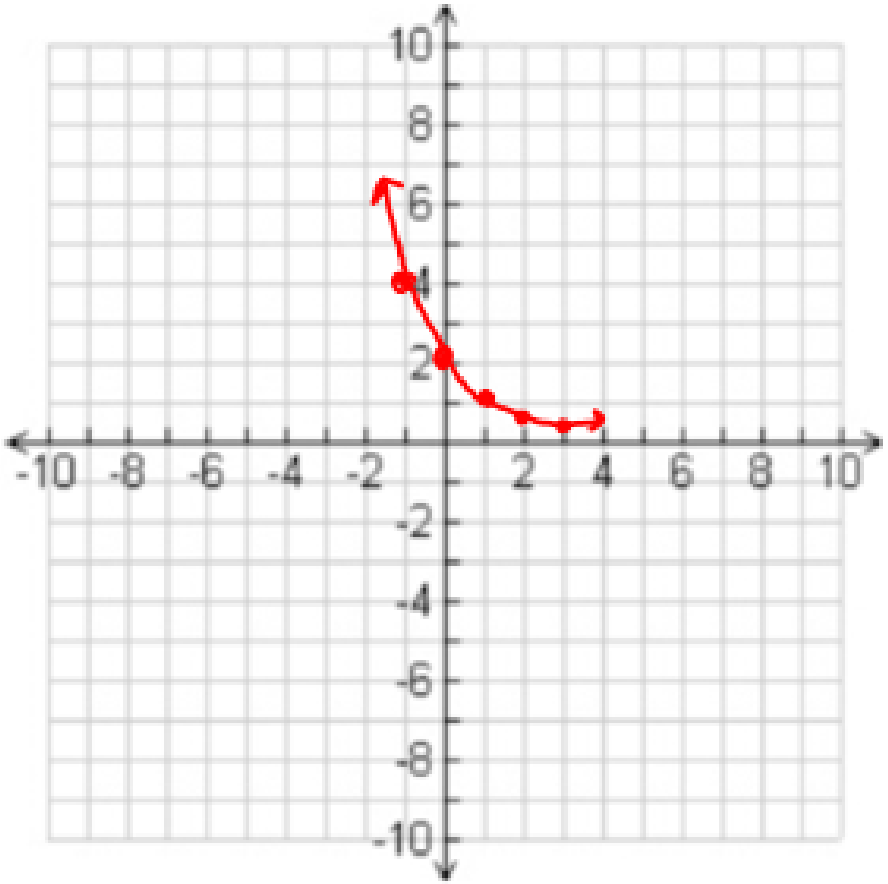


5) (−2, −4), (−1, −2), (0, 0) (1, 2), (2, 4)

Linear



7) (−1, 4), (0, 2), (1, 1), (2, ½), (3, ¼)

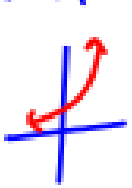


Exponential Decay

Graphing Exponential Functions:

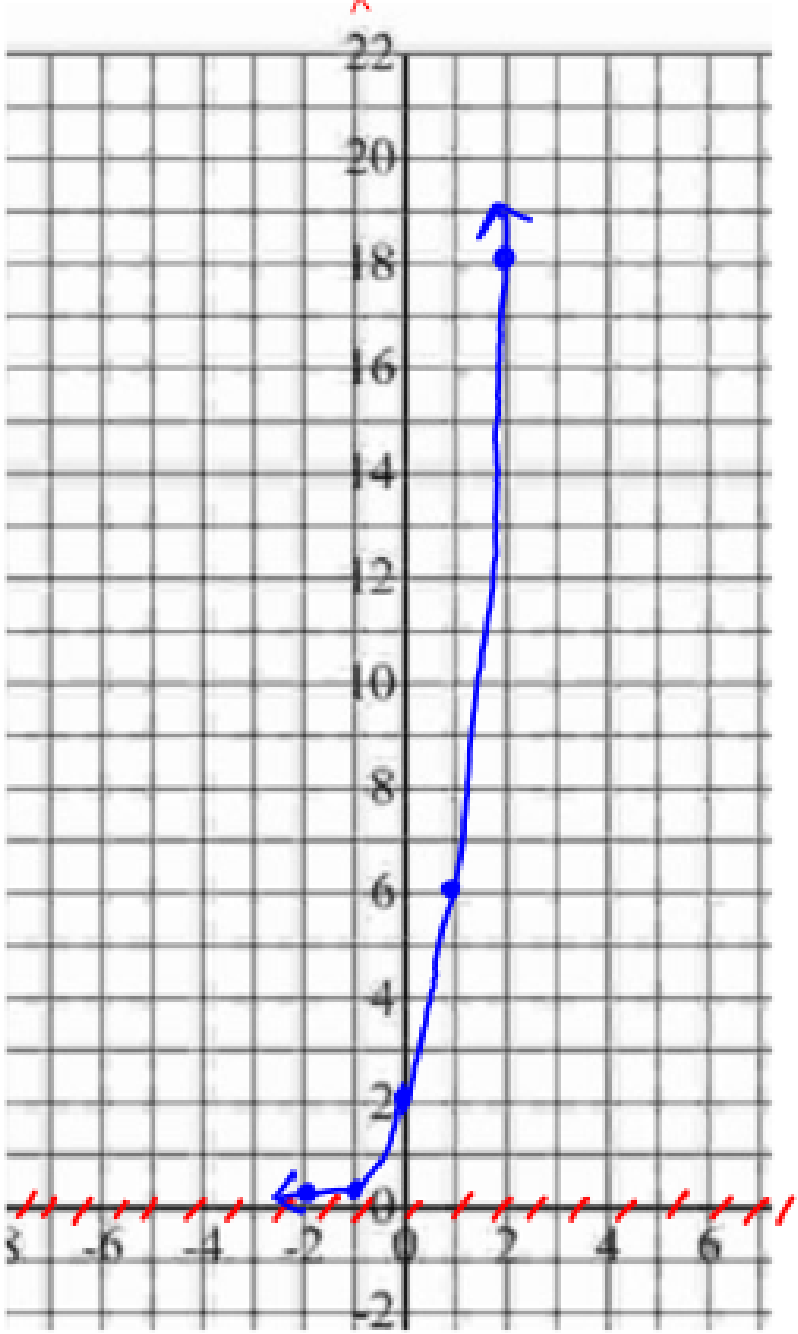
$X^{-2} = \frac{1}{X^2}$

8) $y = \overset{a}{2}(\overset{b}{3})^x$ $a>0,\ b>1$ growth



Asymptote: x-axis

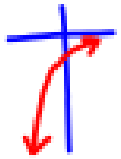
x	$y = 2(3)^x$	(x, y)
−2	$2(3)^{-2} = 2\left(\frac{1}{3}\right)^2 = 2\left(\frac{1}{9}\right) = \frac{2}{9}$	$(-2, 2/9)$
−1	$2(3)^{-1} = 2\left(\frac{1}{3}\right) = \frac{2}{3}$	$(-1, 2/3)$
0	$2(3)^0 = 2(1) = 2$	$(0, 2)$
1	$2(3)^1 = 6$	$(1, 6)$
2	$2(3)^2 = 2(9) = 18$	$(2, 18)$



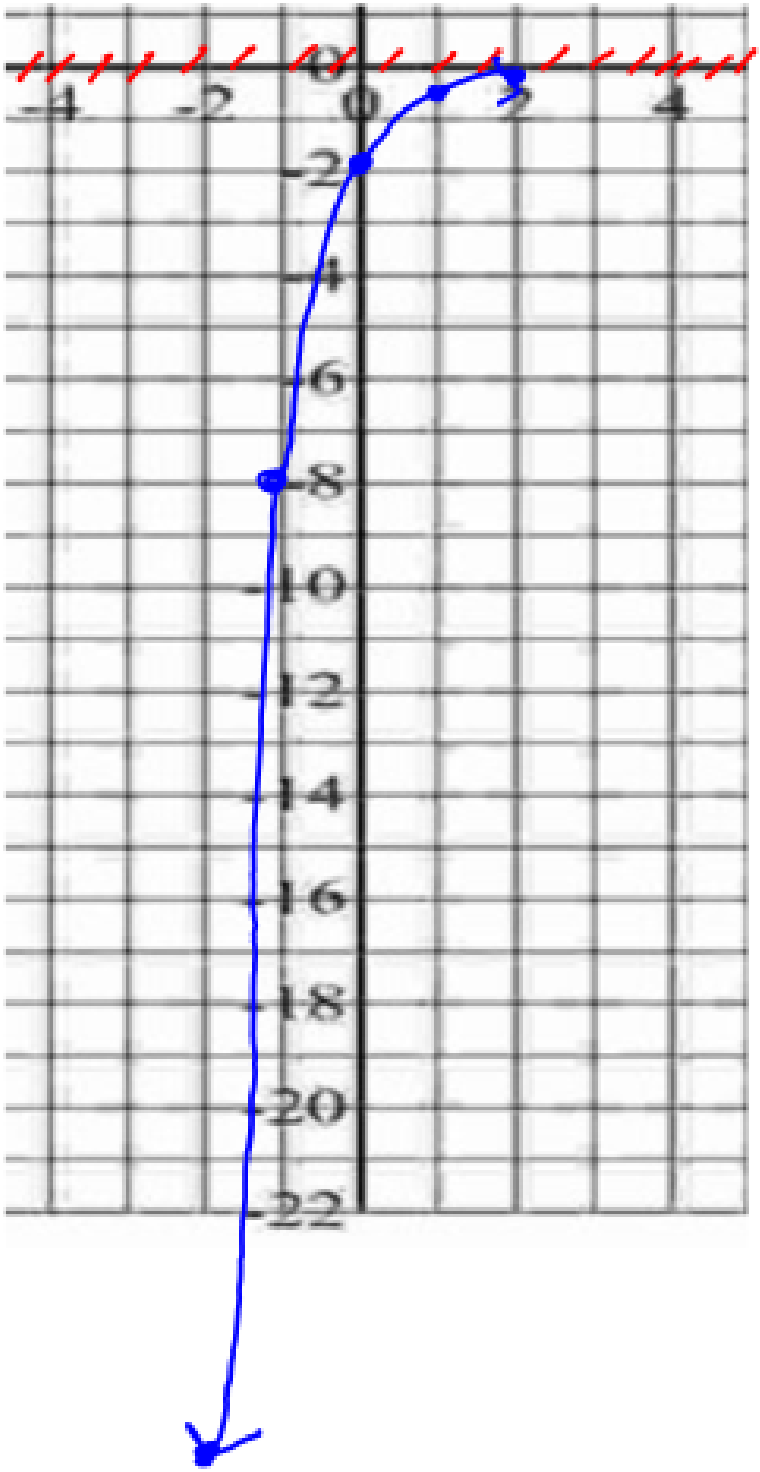
9) $y = -2(\frac{1}{4})^x$ $a<0$, $b<1$

(a = -2, b = $\frac{1}{4}$)

Asymptote: x-axis



x	$y = -2(\frac{1}{4})^x$	(x, y)
−2	$-2(\frac{1}{4})^{-2} = -2(4)^2 = -2(16) = -32$	(−2, −32)
−1	$-2(\frac{1}{4})^{-1} = -2(4)^1 = -8$	(−1, −8)
0	$-2(\frac{1}{4})^0 = -2(1) = -2$	(0, −2)
1	$-2(\frac{1}{4})^1 = -\frac{2}{4} = -\frac{1}{2}$	$(1, -\frac{1}{2})$
2	$-2(\frac{1}{4})^2 = -2(\frac{1}{16}) = -\frac{1}{8}$	$(2, -\frac{1}{8})$



Try) $y = (3)^x$

Asymptote: x-axis

x	$y = (3)^x$	(x, y)
-2	$3^{-2} = 1/9$	$(-2, 1/9)$
-1	$3^{-1} = 1/3$	$(-1, 1/3)$
0	$3^0 = 1$	$(0, 1)$
1	$3^1 = 3$	$(1, 3)$
2	$3^2 = 9$	$(2, 9)$